

ment, where the rings which encircle them are not complete, a membrane taking their place in that portion of each tube which is contiguous to its opposite neighbour. Each bronchus, lower down, is composed of complete cartilaginous rings (vide fig. 2, p. 300).

By many ornithologists Tantalus is arranged along with Platalea and Ibis, instead of with the Storks. Nitzsch, in his 'Pterylography,' places it with Ciconia in his group Pelargi, separating off Platalea and Ibis to form the Hemiglottides. In the "Revised List" of the Animals in the Society's Gardens, Mr. Sclater adopts the same arrangement. In my paper "On the Nasal Bones of Birds"*, it is mentioned that Platalea and Ibis are schizorhinal—that is, have the external osseous nares split up in a manner there described, in which point they differ from the rest of Prof. Huxley's Pelargomorphæ, and therefore from Tantalus.

There are many other structural peculiarities which make it perfectly certain that *Tantalus* is a member of the Ciconiidæ, and not an aberrant one either. Some of the most important it will not be out of place to mention here. They will be most easily appreciated

in a tabular form, as thus represented:-

In Ibis and Platalea.

The skull is schizorhinal.

The angle of the mandible is

produced and recurved.

The pectoralismajor muscle is simple, not being separable into distinct layers.

The accessory femoro-caudal muscle is well developed.

The semitendinosus muscle is

muscular throughout.

A small muscular belly is sent from the biceps cubiti to the tendon of the tensor patagii longus muscle.

In Ciconia and Tantalus.

The skull is holorhinal.

The angle of the mandible is truncated.

The pectoralis major muscle is in two layers, a superficial and a deep, easily separable one from the other.

The accessory femore-caudal muscle is absent.

The semitendinosus muscle is tendinous for its distal half.

No slip leaves the biceps cubiti muscle to join the tensor patagii longus.

4. A Review of the British Marine Mites, with Descriptions of some new Species. By George Stewardson Brady, C.M.Z.S.

[Received March 16, 1875.]

(Plates XLI. & XLII.)

The marine Mites hitherto described either by British or foreign authors are very few in number; and the descriptions seem for the most part to have been based on the observation of but few individuals, often only one or two for each species. The animals have

* P. Z. S. 1873, p. 33.

usually been detected creeping on the stems of seaweeds or zoophytes or on the sides of marine aquaria; and to catch them in this fashion has doubtless the great advantage of presenting the creatures alive, so that their motions and habits, as well as the anatomical details of such delicate organs as those of the mouth, which are of course in active operation during life, may be more readily observed. own knowledge of the Mites however, is, derived almost entirely from the examination of dead specimens; for though I have often found them living plentifully under stones and in the crevices of rocks on the sea-shore, the method of capture which I adopt has always killed them. The little animals are very active, running with great agility; and as a sudden nip of the forceps would most likely mutilate them so much as to render them useless for examination, I have usually when collecting dropped a little spirit from a full camel's hair pencil over the retreating speck and so brought its movements to a stand-still for a time sufficient to allow of his imprisonment: possibly if put into sea-water at once he might in some cases recover the temporary shock of the spirit bath, inasmuch as I have seen one species (Pachyanathus seahami) retain its vitality even after an immersion of many hours in a pretty strong arsenical solution, and I have also noticed that two or three drops of proof spirit does not always suffice to arrest the movements of the Acari over stones or seaweed. The great majority of my specimens, however, have been obtained from the washings of material dredged in depths of several fathoms, and have not been observed until after prolonged immersion (in spirit) and death.

In some dredgings made off the coasts of Durham and Yorkshire, the number of individuals was very considerable, almost leading one to the belief that they must in favourable spots colonize the mud almost as thickly as their better-known relatives a decaying cheese.

The only British naturalists who have written on the marine

Mites are, so far as I know, Allman, Gosse, and Hodge.

The first-named author described a species (Halarachne halichæri) parasitic in the nostrils of a Scal. Mr. Gosse, in the 'Annals and Magazine of Natural History,' described and figured, with his characteristic accuracy and fidelity, three species, Halacarus rhodostigma, H. ctenopus, and Pachygnathus notops. More recently Mr. Hodge named and described, in the 'Transactions of the Tyneside Naturalists' Field Club,' species which he believed to be new, but some of which must, I fear, be considered spurious; his species were Pachygnathus seahami and P. minutus, Leptognathus falcatus, Halacarus granulatus and H. oculatus. I have myself taken all these in greater numbers than fell to the lot of Mr. Hodge, and have likewise been able to examine the type specimens, which, with the rest of his collection, are now preserved in the Newcastle Museum. The additions which I have been able to make in this paper are the following:—Trombidium fucicolum, Pachygnathus sculptus, Gamasus marinus, and Cheyletus robertsoni.

Mr. Gosse mentions that Fabricius has described two Norwegian marine mites, Acarus zosteræ and A. fucorum; but these seem to

be distinct from any thing at present known to us in Britain. The same author says also, on the authority of M. Paul Gervais, that M. Dujardin "had described a marine *Oribates* in the 'Journ. de l'Institut,' for 1842," but he was unable to verify the quotation.

Besides these, the only marine Acari of which I have found notices are *Thalassarachna verrillii*, described by Dr. A. S. Packard in the 'American Journal of Science and Arts,' vol. i. 1871, and *Pontarachna punctulatum*, Philippi, in Wiegmann's 'Archiv,' vol. vi. p. 191.

1840, pl. iv. figs. 4, 5.

I have not thought it necessary to reproduce in extenso the descriptions of previously known species, but have contented myself with noting their more important characters, combining my own observations with those of prior authors.

Class ARACHNIDA. Order ACARINA. Fam. TROMBIDIADÆ. Genus TROMBIDIUM, Fabr.

TROMBIDIUM (?) FUCICOLUM, nov. sp.

Length $\frac{1}{30}$ of an inch: colour very dark brown, opaque; body tumid, tapered and pointed in front, broadly rounded behind, produced laterally into two angular promontories at the origins of the first and second pairs of legs; surface corrugated. Mandibles consisting of two triangular plates (?) opposing each other in the median line; palps small, obtuse, 4- or 5-jointed, the penultimate joint bearing a small appendage something like an obsolescent unguis. Thighs not distant, all the pairs of legs having origin toward the front of the body. Legs 5-jointed, stout, opaque; second and fourth joints much the longest, first and third shortest; last joint terminating in three falciform claws, one of which is more slender than the rest, bearing near the extremity of the inner margin two short and stout spines, and beset with several (10-12) long slender hairs.

One adult and one young specimen of this species were washed from among the roots of Algæ gathered between tide-marks in Roundstone Bay, Ireland, by Mr. David Robertson. I am not sure that it is rightly referred to the genus *Trombidium*; but it seems to agree with Dugès's definition in most respects. The animal was so much mutilated in the process of examination that I have not been able to give a perfect figure, nor have I succeeded in getting a satis-

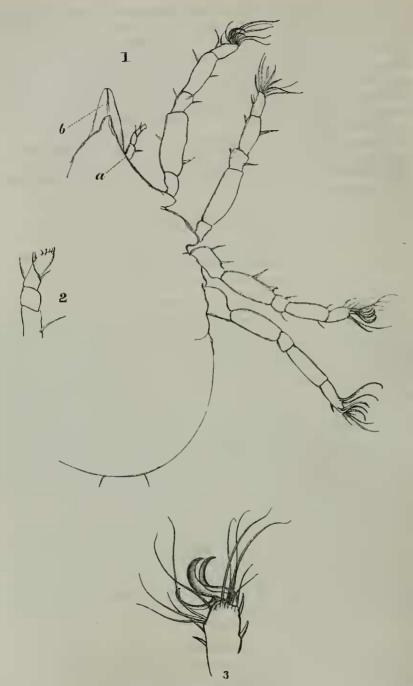
factory view of the mouth-apparatus.

Genus Pachygnathus, Dugès.

PACHYGNATHUS NOTOPS, Gosse, Ann. & Mag. Nat. Hist. ser. 2, vol. xvi. (1855), pl. 8. figs. 1-4.

"Body flat, sinuated, pointed behind, black; one eye on the back; legs equal, the first and second remote from the third and fourth, hairy; the last joint the longest.

"Length 1/87 of an inch. Body lozenge-shaped or somewhat 7-



Trombidium fucicolum.

Fig. 1. Right half of animal, magnified about 100 diameters. a. palp; b, mandibular plates.
2. Palp, more highly magnified.
3. Extremity of foot, more highly magnified.

sided, with sinuations at the origin of the limbs; it is hyaline and colourless at the margins; but the interior is almost filled with a flesh of deep blue-black hue, perfectly opaque, and of defined, subregularly sinuous outline. In the centre of the back, just behind the head, is a bright ruby-like round eye, placed in front of the

opacity and between the first legs.

"The head, formed by a great lip, projects in front and carries two small palpi, thick at the base, conical and pointed. Below, the lip is divided longitudinally, each half being slightly incurved and pointed, the two divisions approaching in a pincer-like manner. Under slight pressure there were projected between the palpi two slender styles, which doubtless represent the mandibles; and hence I am not sure whether the species should not range under the genus Raphignathus of Dugès.

"The legs are about equal and alike; the fourth and sixth joints are large and swollen; the seventh is the largest and tapers abruptly at the middle like a claret-bottle; the tip forms a little round disk, whence diverge a pair of curved hooks, with plain edges, but two-toothed at the tip, or rather having a prominent tooth over the tip.

"All the joints are well furnished with straight bristles, the sixth having one much longer and stouter than the rest. The limbs are set in two series, the first and second originating close together, but remote from the third and fourth, which are also contiguous to each other."

Not having seen any undoubted specimen of this species, I have transferred Mr. Gosse's description, which was drawn from specimens taken at Ilfracombe.

Mr. Norman notes it as being "abundant on weeds in rock-pools, Balta Sound, Shetland."

PACHYGNATHUS SEAHAMI, Hodge, Trans. Tyneside Nat. F. C. vol. iv. p. 319, pl. xvi. figs. 1 a, b, c.

This species agrees in every respect with the foregoing, except in the structure of the claws, which are angularly bent and finely ciliopectinate on the inner margin. It may perhaps be doubted whether it ought to rank as a distinct species, though Mr. Gosse appears to have been disposed to think so, after having seen Mr. Hodge's specimens. The type specimens were taken on the Durham coast; and I have myself found it plentifully on weeds between tide-marks at Sunderland, in the Scilly Islands, and on the west coast of Ireland.

PACHYGNATHUS MINUTUS, Hodge, Trans. Tyneside Nat. F. C. vol. iv. p. 301, pl. xvi. figs. 10, 11.

Length $\frac{1}{90}$ of an inch: colour reddish brown; shield truncate at insertion of first legs. Rostrum a stout bulb, tapering abruptly, and terminated by two lip-like organs; legs short and stout, the third and fifth joints swollen, sixth tapering abruptly and terminating in two falcate claws, which have a small tooth on the outer edge; between the claws a small hook. Eye single, situated behind the rostrum. Body minutely corrugated and pitted. Legs three pairs.

Proc. Zool. Soc.—1875, No. XX.

The single specimen on which Mr. Hodge founded this species was taken on a stem of Coryne eximia from between tide-marks; and there can be little doubt, from the fact of its possessing only three pairs of legs, that it is merely the young of some other species. The specimen, moreover, which is now in the Museum of the Natural-History Society at Newcastle-upon-Tyne, has in other respects the appearance of immaturity, the surface-markings and different areas of the body being very imperfectly defined. I strongly suspect that it may prove to be an early stage of the following species.

PACHYGNATHUS SCULPTUS, nov. sp. (Plate XLII. figs. 1-6.)

Length $\frac{1}{4.5}$ of an inch: colour reddish brown. Body oblongovate, deeply indented at the origin of the limbs. The head forms a wide bulbous projection, from which springs a rather short and thick mucronate rostrum. The mandibles and palps are both poorly developed, the latter being short, thick, and terminating in small claws, the former consisting each of a short, slightly curved stem, which is furnished with two small setæ and a wart-like tooth on the concave margin. The two hinder pairs of legs are rather longer and more slender than the rest; thighs distant, being inserted near the margins of the body; second and fourth joints of the legs very small and constricted; third and fifth (especially in the first two pairs) larger and much swollen; first joint small in the two anterior pairs, rather longer in the two posterior; last, or sixth, joint of moderate length, suddenly tapering from the middle and terminating in two falcate claws, each with a small tooth on its convex margin. The dorsal surface of the body is mapped out into several distinct areas, characterized by pitted and corrugated systems of sculpture: the head and rostrum form an area bounded by a convex line, which stretches between the origins of the first pair of feet: immediately behind, and separated only by a lateral indent, is a subquadrate plate, broad in front and rather narrowed at its posterior extremity, which coincides with the middle of the body; behind this plate again, and separated from it by a narrow isthmus of corrugated epidermis, comes another elongated shield-shaped plate, which stretches quite to the hinder extremity of the body, increasing in width posteriorly: these three areas are all covered with closely set circular pittings, and are divided from each other by spaces of wrinkled epidermis, the lines of which are somewhat waved and irregular, but run generally in a concentric manner round the dotted shields: on the lateral aspects of the body also are two pitted areas, one vaguely defined and embracing the origins of the first and second pairs of legs, chiefly on the inferior surface of the body, the other having very distinct boundaries and extending almost equally on the upper and lower aspects of the body, from midway between the second and third pairs to the origin of the fourth pair of legs. The ventral surface of the body is chiefly corrugated, the head, however, being distinctly pitted as on the dorsal aspect; a space corresponding with the dorsal thoracic shield has no perceptible

sculpture, as also a similar space situated posteriorly and surrounding the anus. The first, second, third, and fourth joints of the legs are also marked with pitted sculpture.

Several specimens of P. sculptus were dredged in 25-35 fathoms, in various localities off the coasts of Durham and North Yorksnire.

Genus Raphignathus, Dugès.

(Leptognathus, Hodge.)

RAPHIGNATHUS FALCATUS (Hodge). (Plate XLII. figs. 7-10.)

Leptognathus falcatus, Hodge, Trans. Tyneside N. F. C. vol. v. p. 302, pl. 16. figs. 6, 7.

Length \(\frac{1}{28}\) of an inch: colour orange-brown. Body truncate above insertion of first legs. Head forming a broad subtriangular bulbous projection, from the front of which stands out a long, slender, bifid rostrum, between the valves of which, by pressure or dissection, may be discovered two slender, curved, unguiculate and protrusile mandibles. Palps very long and slender, extending beyond the tip of the rostrum, and bearing towards the extremities a few fine setæ. Legs of moderate and nearly equal length; the joints not much differing in size, except the last, which is long, thin, and terminated by two simple claws; thighs remote. Eyes three, one behind the base of the head, the others near the origin of the second pair of legs. Upper surface of the body divided by delicate furrows or striæ into four symmetrically arranged areolæ—two lateral, one anterior, and one posterior.

I have not been able thoroughly to satisfy myself as to the anterior eye spoken of by Mr. Hodge. I can find no trace of it in his type specimen; but I think I can detect something like it in one of my own. However, Hodge's description is so circumstantial that I conclude it must have been plainly visible in the fresh state of his specimen. I think there can be little doubt that the species is

properly referable to the genus Raphignathus of Dugès.

Mr. Hodge's specimens were taken on the Durham coast in depths of from 20 to 30 fathoms. Several examples have been more recently dredged by Mr. David Robertson and myself on the same coast and also amongst the Scilly Islands in a depth of 10-12

fathoms.

Fam. GAMASIDÆ.

Genus Gamasus, Latreille.

GAMASUS MARINUS, nov. sp. (Plate XLI. figs. 5-7.)

Length $\frac{1}{12}$ of an inch: colour yellowish brown. Body regularly oval, beset with scattered hairs; thighs contiguous, springing from near the median line. The palpi are large and thick, 6-jointed, obtuse, recurved at the extremity, the last joint thickly beset with rather long hairs: the mandibles are (in the adult) longer than the palps, and end in two strong denticulated nipping-claws like those of the hand of a lobster; externally, between them and the palps,

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there is a styliform appendage (fig. 6, b). The first three pairs of legs are of nearly equal length, the last pair distinctly longer, all gradually tapering from the base and having subequal joints, except the third and penultimate joints, which are short, and the last, which is long, slender, and tapering, and terminates in two delicate claws. The limbs, as well as the body, are beset with stout hairs, the last joints of the legs being rather thickly tufted. Eyes two, lateral, at the base of the second pair of feet.

There is a good deal of diversity in the proportions and development of the mandibles and palps in different individuals of this species, probably dependent upon age (or sex?). The more highly magnified figure (fig. 6) seems to me to belong probably to the adult, while the state of the parts shown in the drawing of the entire animal (fig. 5) may be supposed to be characteristic of youth. In some specimens the lower joints of the legs are liable to run out

into irregular subspinous processes.

G. marinus occurs pretty commonly in crevices of magnesian limestone rocks, between tide-marks, near Sunderland; and I have a specimen which was washed from amongst the roots of Algæ dredged off Cumbrae in the Frith of Clyde.

Genus Cheyletus, Latreille.

CHEYLETUS ROBERTSONI, nov. sp. (Plate XLI. figs. 1-4.)

Length $\frac{1}{40}$ of an inch; pellucid, smooth, almost colourless. Body broadly ovate, constricted in front of the origin of the first pair of legs, the head and rostrum forming a triangular prominence, the lateral angles of which are much produced; from the front of these angles spring two very tumid, imperfectly jointed palps, which reach beyond the tip of the rostrum, and terminate in a large curved claw and several long setæ, two of which are beautifully pectinated on their inner margins with long, tooth-like cilia: the swollen base of the palp bears a single long hair, which reaches much beyond the point of the terminal claw. The rostrum consists apparently of two opposing triangular plates, from the tips of which spring two small setæ. The two hindmost pairs of legs are of nearly equal length, the second somewhat shorter, all bearing a few long scattered hairs, and having long and slender terminal joints which are armed with delicate, doubly curved claws (figs. 3 and 4). The legs of the first pair are much longer and more slender, antenniform, the joints gradually tapering and increasing in length from first to last: the thighs are moderately remote. Two long lateral hairs spring from near the middle of the body between the second and third pairs of legs; and there are two lateral tufts of three hairs each near the posterior extremity.

One specimen only of this remarkable mite was dredged off Hawthorn, on the Durham coast, in a depth of 27 fathoms. I have named it after my valued friend Mr. David Robertson of Glasgow, who was my companion on the dredging-expedition when it was taken. The mouth-organs are so like to those of *Cheyletus erudi-*

tus, Latreille, as figured by Dr. Johnson in his monograph of the Acarides of Berwickshire*, that I cannot doubt the propriety of referring it to the same genus.

Genus Halaracune, Allman.

Halarachne halichæri, Allman, Ann. & Mag. Nat. Hist. vol. xx. 1847, p. 47.

Parasitic in the posterior nares of a Seal (Halichærus gryphus).

Fam. ORIBATIDÆ.

Genus HALACARUS, Gosse.

Halacarus rhodostigma, Gosse, Ann. & Mag. Nat. Hist. ser. 2, vol. xvi. (1855), pl. 3. figs. 1-5.

Halacarus granulatus, Hodge, Trans. Tyneside Nat. F. C. vol. v. p. 299, pl. 16. figs. 4, 5.

Halacarus oculatus, Hodge, Trans. Tyneside Nat. F. C. vol. v.

p. 300, pl. 16. figs. 8, 9.

"Body divided above and below; claw of palpus slender, little curved; legs nearly equal; thighs of first pair ventricose; claws all

simple; whole surface minutely punctured.

"Length $\frac{1}{12}$ of an inch from anus to tip of rostrum: colour pellucid whitish, stained with pale red on the anterior half; above and below studded with punctures, which under a high power take the form of rosettes or the spots on a panther's coat; the punctures are conspicuous on the first thighs, but are scarcely visible on the other limbs; the haunches are moderately distant at their origin, springing from the margin of the body, the shield being notched to give them exit; the third joint of the legs is the largest, much swollen in the first pair; the fifth is also large; and the sixth is long but slender, tapering abruptly from the middle; the claws are simple hooks, much curved, neither pectinated nor tipped with an accessory piece, but the joint from which they spring is tipped with two nearly parallel styles: the legs are equal in length.

"The shield of the body above is subtruncate in front, but projects in a small median point, long-oval, with a transverse sulcus at the origin of the second legs. Below, the body has two transverse divisions—one at the origin of the first legs, another at the origin of

the third.

"The rostrum forms a thick bulb, tapering to a point, from which, during life, I observed two apparently soft, flexible, filiform, divergent organs (mandibles?) protruded and retracted. Palpus of four joints, of which the second is hy far the largest; terminal joint slightly curved, pointed, and furnished near the base with two strong bristles on the inner side and one on the outer. All the joints of the legs are armed with a few short bristles. The vulva occupies a large oval area at the hind part of the venter; and the anus is terminal."

^{*} Transactions of the Berwickshire Naturalists' Field-Club, vols. ii. & iii.

The foregoing description (though not copied verbatim) comprises all the more important particulars noted by Mr. Gosse; and, allowing considerable margin for individual variation, it applies perfectly well to such examples of the species as have come under my notice. Mr. Gosse found it not uncommon among seaweeds from low-water mark at Weymouth; Mr. Hodge dredged it in a depth of 20 fathoms off the Durham coast; I have myself taken it abundantly in pools of brackish water at the side of the Burn, Seaton Sluice, Northumberland, and have also found it in great numbers in almost all dredgings from the coasts of Durham and Yorkshire, as well as in the Frith of Clyde.

It is with no little regret that I feel quite unable to draw any specific distinction between the forms described by my old friend Mr. Hodge (H. granulatus and H. oculatus) and the prior species H. rhodostigma, Gosse. H. oculatus is, I think, without doubt only the young; and, excepting some trivial distinction of surface-markings, I cannot find out on what Mr. Hodge relied to distinguish

his supposed species.

HALACARUS CTENOPUS, Gosse, loc. cit. pl. 3. figs. 6-10.

Body smooth, granulated, divided below only; length 32 of an inch; colour variable, dark red or yellowish brown, often with a white line down the centre; nearly oval, pointed in front, excavated at the insertions of the legs; transversely sulcate beneath, opposite the origin of the third pair of legs. The rostrum is more attenuated than in H. rhodostigma; but the palpi are stouter, the last joint being a short hook, and both it and the preceding joint bear a small spine upon the inner margin. The legs are of nearly equal length; thighs remote (laterally), those of the first two pairs and last two pairs of each side respectively originating close together; the joints diminish gradually in length and width to the last, which bears two falcate claws: each of these has an accessory piece near the extremity of the convex margin, and is strongly pectinated along the conave edge. Eyes two, large, situated near the base of the second pair of legs, and one much smaller near the base of the bulb of the rostrum.

The feet of the first pair are often armed on the middle of the inner edge of the third, fourth, and fifth joints (or one or more of them) with a single stout spine; but this is very variable, as also is the

length and strength of the setiferous armature in general.

Mr. Gosse described this species from one specimen found in company with the foregoing. It seems, however, to be of common occurrence, and generally distributed round the British coast. I have taken it on weeds between tide-marks and a little below low-water mark at Cullercoats (Northumberland), Westport and Birterbuy Bays (Ireland), Little Cumbrae (Frith of Clyde), Isles of Aran (Galway Bay), and amongst the Scilly Islands; Mr. Robertson and myself have also dredged it in depths of 7-29 fathoms off Portincross (Ayrshire), in 20-35 fathoms off Red Cliff, Yorkshire, and in 10-12 fathoms off the Scilly Islands. Mr. Norman says it is

common among weeds in the littoral and laminarian zones in Shet-land.

EXPLANATION OF THE PLATES.

PLATE XLI.

Fig. 1. Cheyletus robertsoni, seen from below.

2. Ditto, palp.

3. Ditto, extremity of first foot. More highly magnified.

4. Ditto, extremity of third foot.

- 5. Gamasus marinus, seen from below.
- 6. Ditto, mouth-organs, more highly magnified: a, mandible; b, styliform appendage; c, palp.

7. Ditto, extremity of foot.

·PLATE XLII.

Fig. 1. Pachygnathus sculptus, seen from below.

2. Ditto, seen from side.

3. Ditto, body seen from above.

4. Ditto, mandibles.

5. Ditto, palp. More highly magnified.

6. Ditto, extremity of foot.

7. Raphignathus falcatus, seen from above: a, palp; c, mandibular sheath.

8. Ditto: a, palp; b, protrusile mandible; c, mandibular sheath.

9. Ditto, protrusile mandible.

More highly magnified.

10. Extremity of foot.

5. Description of a new Species of *Chrysochloris* from South Africa. By Dr. Albert Günther, V.P.Z.S.

[Received April 3, 1875.]

(Plate XLIII.)

Mr. Herbert Trevelyan has presented to the Trustees of the British Museum the skin of a new species of Chrysochloris, which is distinguished by its gigantic size, being nearly double the size of any of the other species known. He obtained it from a Kaffir who accompanied a shooting-party in the Pirie Forest near King William's town (British Caffraria), and believes that it must be very scarce or local, as none of his companions had ever seen another specimen. Unfortunately the skull has not been preserved; otherwise the skin is in a most perfect condition. I name this species after its discoverer, and characterize it as follows:—

CHRYSOCHLORIS TREVELYANI.

Nine and a half inches long. The colour and quality of the fur reminds one of that of an Otter; it is moderately long, rather stiff, and of a deep chocolate-brown colour, with a dense whitish underfur. Margin of the lips white. On the abdomen the fur is less dense and shorter; and patches of the whitish under-fur are visible in the posterior parts of the abdomen. Muffle flat, projecting as in the other species, but comparatively narrower. Claws whitish; the inner and